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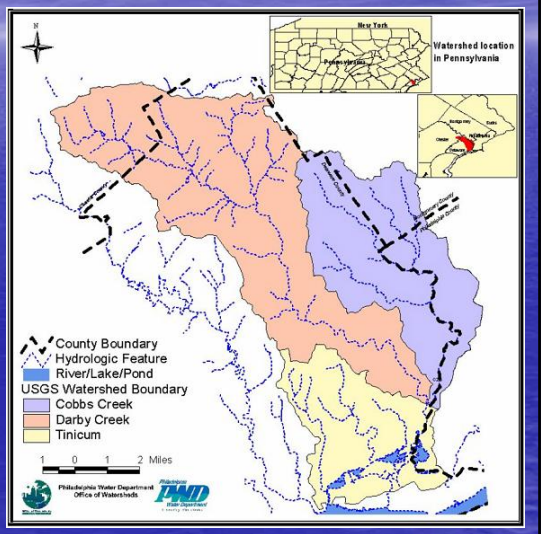
Philadelphia District

Darby-Cobbs Watershed Sediment Assessment

- Darby-Cobbs watershed discharges to the Delaware Estuary through the wetlands of the John Heinz National Wildlife Refuge at Tinicum
  - 80 mi² of southeastern Pennsylvania
  - Divided into 3 subwatersheds: Cobbs Creek, Darby Creek, and Tinicum



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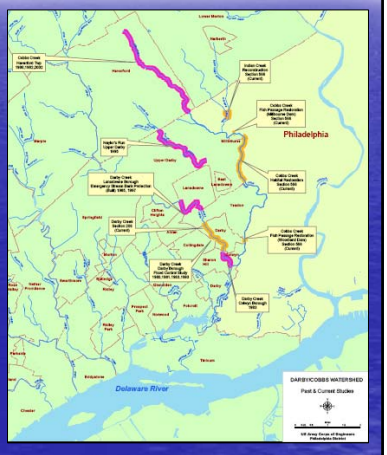
Darby-Cobbs Watershed Sediment Assessment

- NAP initiated 19 official studies over the past 35 years
  - Studies from a municipality-based scale have not been effective
- Problems:
  - Erosion,
  - Deposition,
  - Urban sprawl,
  - Degraded habitat,
  - Flooding (also from stormwater),
  - Multiple stakeholders with conflicting interests
    - 31 municipalities, 4 counties
    - Sponsorship issues



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Erosion, deposition


Urban sprawl

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Darby-Cobbs Watershed Sediment Assessment

Unbiased watershed-scale assessment is needed

- Take sediment transport into account
  - many problems result of imbalances in sediment equilibrium
- Determine specific causes of problems
- Analyze project alternatives using Sediment Impact Assessment Model (SIAM) and other models
- ID effective design & remediation needs
- Write a comprehensive watershed plan
  - Immediate & long-term solutions for Corps & others

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Darby-Cobbs Watershed Sediment Assessment

RSM program

- Allows non-traditional assessment to be conducted while sponsorship & political issues are being sorted out
- Products will:
  - Expedite Feasibility Phase of future studies
    - Construction could be co-sponsored by municipalities ID'd by model
  - Improve planning & design of ongoing & future projects

Ideal demonstration project

- Opportunity for USACE to apply unbiased technical expertise to practical issues
- Urban watershed issues not unique to this area:
  - Take sediment transport into account
  - Provide framework applicable nationwide

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Darby-Cobbs Watershed Sediment Assessment

Phase 1: Preliminary Evaluation

Completed in FY06

- Coordinated with multiple stakeholders
  - 10 municipal & county env agencies & watershed groups
- Assessed the watershed with a 3-day field investigation
  - Meg Jonas
  - 24 sites representative of various conditions

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Darby-Cobbs Watershed Sediment Assessment

Phase 2: Detailed Assessment

Completed in FY07

- What data already exists?
  - Coordinated with partners & compiled reports
  - Digitized old reports
  - Organized reports in a database

A	B	C	D	E	F	G	H
Source (title)	Source (author)	Description	Location	Hydrological Models	Geomorphologic Surveys	Hydraulic Models	Other (specify)
1972 Report on Survey Investigation Flood Control and Allied Purposes in Darby Creek-Cobbs Creek Watershed Pennsylvania	CORPS OF ENGINEERS	Report evaluated alternatives to reduce flood stage and identify associated recreational opportunities. The selected plan included a comprehensive flood plain management program combined with channel relocation, levees, floodwalls, a detention basin and basic recreational facilities.	Darby-Cobbs Watershed	This report featured standard hydrographs measuring storm related base and peak flows, discharge frequency, six hour storms, and synthetic S curves.	Report proposed stream straightening and fill, earth levees, concrete floodwalls and a detention basin across a detailed flood area spanning several townships across the watershed.	Hydraulic models were not featured in this report	Report included cost estimates, flood damages and benefits and flood control improvement tables and figures.
1973 Final Environmental Impact Statement Darby Cobbs Creek Watershed, Flood Control and Recreation Project	CORPS OF ENGINEERS	This was an evaluation of the environmental impacts of alternatives identified in the 1972 study including structural and non structural flood control strategies along with development of recreational facilities.	Darby-Cobbs Watershed	Hydrological models were not featured in this report.	This report featured channel profiles and cross sections.	Hydraulic models were not featured in this report.	
1974 Report on Flooding in Marshall Road Area August 23, 1974 Philadelphia PA	CORPS OF ENGINEERS	Investigation of fourteen inch rainfall in three hours and subsequent flooding of Cobbs Creek in Marshall Road area. Report recommended future courses of action.	Cobbs Creek Watershed	Hydrological models in this report were based on HEC-1 computed rainfall runoff model. The Log Pearson Type III method determined discharge-frequency relationships.	Geomorphic surveys featured were stream profiles produced from field surveys, cross sections, and bridge measurements.	The HEC-II Backwater Program was used.	
1977 Special Flood Hazard Report for Darby and Muckinipattis Creek Delaware County PA (Flood Plain Information Report authorized under the continuing authority of 1960 Flood Control Act)	CORPS OF ENGINEERS	Report includes water budgets, cross sections, stream profiles, and field surveys for Darby and Muckinipattis Creeks and provides information in determining the size of future flood events.	Darby and Muckinipattis Creeks in Delaware County	Hydrological models were not featured in this report.	Geomorphologic surveys were not featured in this report	Hydraulic tables measuring the flow frequency and velocity of Darby Creek were used in the study.	This report featured first cost estimates and benefit summary tables.
1979 Darby Creek Lansdowne, Delaware County, Pennsylvania, Reconnaissance Report, Stream Bank Erosion Control Problem	CORPS OF ENGINEERS	Report captured hydraulic data and recommended alternatives such as gabion construction, removal of a midstream island and building riprap revetment along the stream bank near the Hilldale Road Bridge. Investigation concluded that suggested alternatives are not economically justified or	Darby Creek, Lansdowne Borough	Hydrologic data derived from Bulletin no.13, Floods in Pennsylvania method.	Geomorphologic surveys were not featured in this report.	Rosettes containing evaluation discharge frequency damage curves for Cobbs Creek were used in this study.	This report featured damage and construction calculations.
1980 Cobbs Creek, Haverford Township, Delaware County, Pennsylvania, Flood Control Problem Reconnaissance Report	CORPS OF ENGINEERS	Report recommended a further investigation of flood protection plans for the study area. Structural flood proofing against the 10 year flood event was	Cobbs Creek, Haverford Township	Hydrologic modeling was designed using HEC-1 computed rainfall runoff model with Log Pearson Type III method.	This report included cross sections for geomorphologic alternatives.	Hydraulic models were not featured in this report.	Report included tables listing summary of discharges and average annual damage reaches. Maps showing

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Darby-Cobbs Watershed Sediment Assessment

Phase 2: Detailed Assessment

FY08 Efforts

Data prep for model input & public outreach

Where was the data taken?

- Refine database, georeference data, and create interactive map for website
- Reports available to public for download

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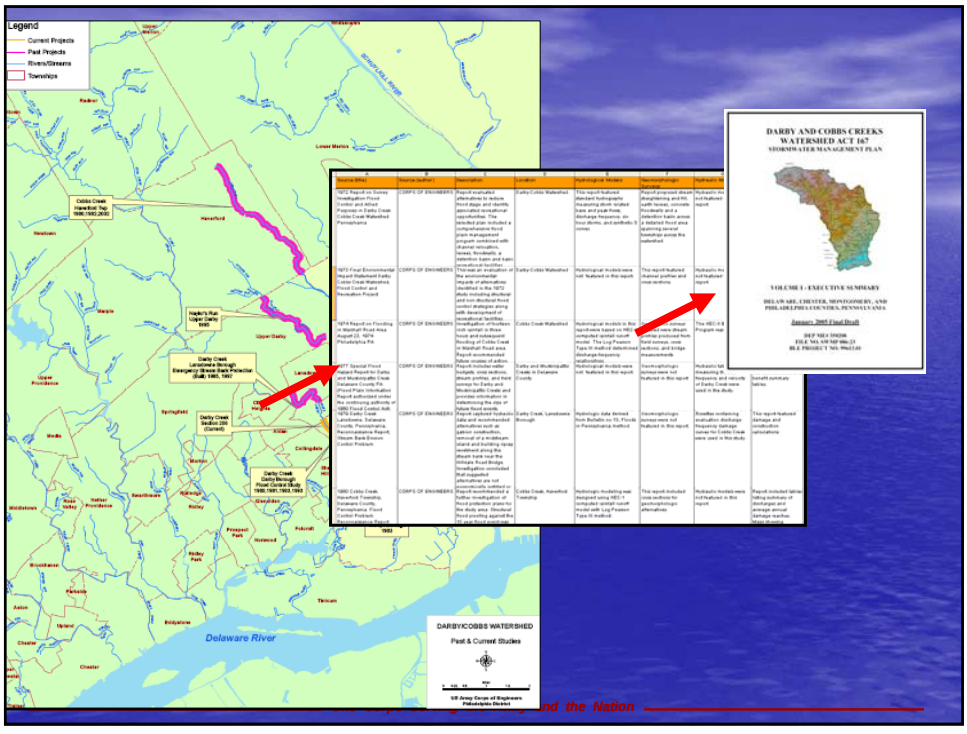

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Darby-Cobbs Watershed Sediment Assessment

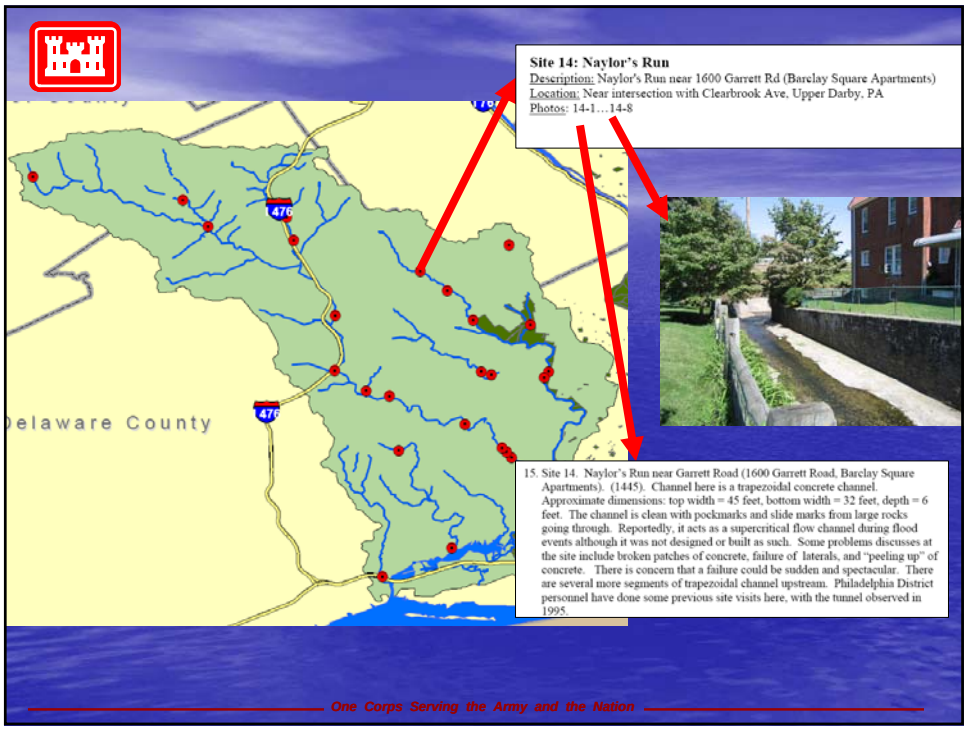
Phase 2: Detailed Assessment

FY08 Efforts (cont.)

Public outreach & use of 2006 site visit info

Virtual tour of watershed

- ~300 photos georeferenced to sites representative of various conditions in the watershed
- Linked to notes describing site conditions



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Darby-Cobbs Watershed Sediment Assessment

Phase 2: Detailed Assessment

FY08 Efforts (cont.)

- Educational pamphlet
  - Address the "pass the problem down the river" mindset with explanations of urban stream dynamics
    - Prep for future restoration work
  - Watershed groups will handle distribution

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Future efforts

Phase 2: Detailed Assessment (cont.)

- Extract data from reports
- Conduct watershed-wide baseline geomorphic assessment, evaluate channel stability & collect bed & bank material samples
  - Evaluate existing data
  - Desk assessment
  - Field investigation
- Collect additional data

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Darby-Cobbs Watershed Sediment Assessment

Future efforts

Phase 3: Analysis and Planning

- Format data for model input
- Analyze project alternatives using Sediment Impact Assessment Model (SIAM) and other models
- Comprehensive watershed plan
  - Immediate & long-term solutions for Corps & others
  - Address bank erosion/sediment deposition, dam/impediment removal, greenways, riparian buffers, sediment input into Delaware Estuary
  - Include advance designs for more immediate objectives

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Future efforts

FY09

Sediment Budget

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